

000034

222520040061

Rev 1

**CORRESPONDENCE DISTRIBUTION COVERSHEET**

Author

R. A. Bushaw  
373-4314

Addressee



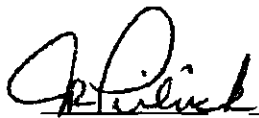
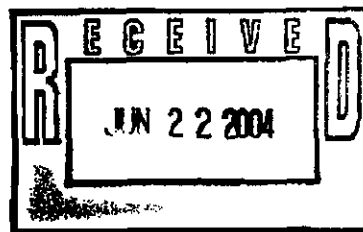
Correspondence No.

CH2M-0401824  
June 17, 2004

Subject:

FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH-  
COLLECTED DURING MARCH AND APRIL OF FISCAL YEAR 2004**DISTRIBUTION**

Approval	Date	Name		Attach
		CH2M HILL Correspondence Control	H6-08	X
		<u>CH2M HILL Hanford Group, Inc.</u>		
		R. A. Bushaw	T6-12	X
		K. M. Hall	T6-12	X
		B. R. Hill	T6-03	X
		K. L. Powell	T6-04	X
		J. R. Prilucik	T6-12	
		D. L. Renberger	T6-03	X
		C. M. Seidel	T6-14	
		Project Files	T6-12	X
		APM LB/File		

 6-17-04**RECEIVED**  
MAR 21 2006  
EDMC



**CH2MHILL**  
Hanford Group, Inc.

CH2M HILL  
Hanford Group, Inc.  
P.O. Box 1500  
Richland, WA 99352

June 17, 2004

CH2M-0401824

Mr. S. J. Trent, Manager  
Environmental Information Systems  
Fluor Hanford, Inc.  
Post Office Box 1000  
Richland, Washington 99352-0450

Dear Mr. Trent:

**FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH-COLLECTED  
DURING MARCH AND APRIL OF FISCAL YEAR 2004**

- References:
1. HNF-SD-CP-QAPP-016, "222-S Laboratory Quality Assurance Plan," Revision 8, dated January 29, 2004.
  2. 216-Z-9 Trench Characterization Borehole Sampling and Analysis Concurrence for Analytical Requirements, dated October 2, 2003.
  3. Interoffice Memorandum, H. L. Anastos, FH, to Distribution, "Semi-Volatile Organic Compound Analysis," FH-0300526, dated February 3, 2003.
  4. Interoffice Memorandum, H. L. Anastos, FH, to Distribution, "Volatile Organic Compound Analysis," FH-0300583, dated February 3, 2003.
  5. SW-846, "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods," Revision 3, U.S. Environmental Protection Agency, Washington, D.C., dated December 1996.

This letter and four attachments represent the final analytical data report for the soil samples from the 216-Z-9 characterization borehole that were received at the 222-S Laboratory between March 24 and April 21, 2004. The samples were analyzed in accordance with Reference 1 through Reference 5.

Mr. S. J. Trent  
Page 2  
June 17, 2004

CH2M-0401824

Should you have questions regarding this matter, please contact R. A. Bushaw at 373-4314.

Very truly yours,

A handwritten signature in cursive script, reading "Ruth A. Bushaw".

Ruth A. Bushaw, Project Coordinator  
Analytical Project Management

dtb

Attachments (4)

CH2M-0401824

Attachment 1

NARRATIVE

Consisting of 14 pages, including coversheet

0000004

## 222-S LABORATORY

### FINAL REPORT FOR THE SOIL SAMPLES FROM 216-Z-9 TRENCH—COLLECTED DURING MARCH AND APRIL OF FY 2004

#### 1.0 INTRODUCTION

Seven soil samples from the 216-Z-9 characterization borehole were received at the 222-S Laboratory between March 24 and April 21, 2004. The samples were analyzed in accordance with the *222-S Laboratory Quality Assurance Plan* (Reference 1), *216-Z-9 Trench Characterization Borehole Sampling and Analysis Concurrence for Analytical Requirements* (analytical instructions) (Reference 2), *Semi-Volatile Organic Compound Analysis* (Reference 3), and *Volatile Organic Compound Analysis* (Reference 4), referenced in the cover letter.

A Data Summary Report is included as Attachment 2. The correlation between the customer sample identification number and laboratory identification numbers is presented in the Sample Breakdown Diagrams included as Attachment 3. Copies of the Chain of Custody and Generator Knowledge Information forms are included as Attachment 4.

#### 2.0 SAMPLE APPEARANCE

For easier tracking of results, the samples were logged into the laboratory database as four different sample delivery groups (SDG), as noted in the following.

**SDG 222S20040061**—This SDG consists of one customer sample numbered B17N61. This sample was collected on March 23, 2004. It was delivered to the laboratory on March 24, 2004, in three 40-mL amber bottles with septum lids. Analysis for low-level volatile organic compounds (VOC) was the only request for this sample. The sample was described as dark brown, medium coarse sand.

**SDG 222S20040073**—This SDG consists of three customer samples numbered B18XW3, B18XR8, and B190T8-A. Samples B18XW3 and B18XR8 were collected on April 8, 2004. Sample B18XW3 was delivered to the laboratory on April 14, 2004, in three 40-mL amber bottles with septum lids for low-level VOC analysis only. For sample B18XR8, three 5-g En Core® samplers were received on April 8, 2004, for high-level VOC analysis. On April 16, 2004, two 60-mL bottles and one 120-mL bottle were received as B18XR8 for semivolatile organic compound analysis (SVOA), polychlorinated biphenyl (PCB) analysis and inorganic and radionuclide analyses listed in the analytical instruction. The samples were described as dark brown, medium coarse sand.

8 pages 2/16/06  
Sample B190T8-A was collected and delivered to the laboratory on April 15, 2004. As received, it was labeled as B190T8 for a radscreen analysis. However, after receipt, the customer point of contact requested an additional isotopic plutonium analysis and requested that the results be reported using the sample number B190T8-A. The sample was described as dark brown, medium coarse sand.

**SDG 222S20040100**— This SDG consists of two customer samples numbered B17N64 and B17N68. These samples were collected and delivered to the laboratory on April 21, 2004. Sample B17N64 was received in five 40-mL amber bottles with septum lids for low-level VOC analysis only. Sample B17N68 was received in three 5-g En Core® samplers for high-level VOC analysis only. Sample B17N68 was described like the previous samples: dark brown, medium coarse sand.

For sample B17N64, three of the five bottles contained dark brown, medium coarse sand and the remaining two bottles contained lighter colored, beige, medium coarse sand. The initial low-level VOC analysis was performed using the first three of the bottles in numerical order and was reported as sample number S04M000115. The bottle chosen for the sample analysis contained the beige sand, while the bottles chosen for the matrix spike (MS) and matrix spike duplicate (MSD) analyses both contained the darker brown sand. The customer point of contact was informed of the discrepancy and an additional VOC analysis was requested on the remaining vial that contained darker sand. No additional MS or MSD analyses were performed. The sample results for the additional analysis are reported as sample B17N64-A (S04M000124), as the customer requested.

**SDG 222S20040101**—This SDG consists of one customer sample numbered B191Y4. The sample was collected and delivered to the laboratory on April 21, 2004. Five bottles were received for analysis; one 60-mL bottle was received for SVOA, one 500-mL bottle for radionuclide analysis, and three 40-mL amber glass bottles with septum lids for VOC analysis. On April 28, 2004, the customer point of contact canceled the request for SVOA and radionuclide analyses, and the 60-mL and 500-mL bottles were returned to the customer on April 29, 2004.

The 40-mL bottles were filled to the top with soil, leaving no head-space. No preservative was added to the sample bottles in the field. With the sample received in this configuration, it was unclear whether low-level or high-level VOC analysis was requested, so the chemist preserved portions of the sample for both analyses. The customer point of contact was informed of the decision made by the responsible chemist concerning the VOC, and requested the laboratory to report the high-level VOC analysis using sample number B191Y4-A.

### 3.0 SAMPLE HANDLING

Except for VOC analyses, the samples were stirred with a spatula prior to removing aliquots for analysis. With this type of sample, this method is typically not sufficient to achieve homogenization. However, the relative percent difference (RPD) between sample and duplicate results for most analytes meet the acceptance criteria listed in the analytical instructions, indicating good precision was obtained.

REVISED  
8 pages  
2/16/06

0000000

As noted in Section 2.0 for B191Y4, the sample was provided in three amber glass bottles with no preservative. Because the bottles had to be opened in a hood to obtain aliquots for analysis, the sample integrity was compromised and the results may be biased low.

#### 4.0 HOLDING TIMES

The analytical instructions requested that the laboratory make every effort to meet the SW-846 (Reference 5 in the cover letter) holding times for VOA. Additionally, an e-mail message was received from the customer point of contact on April 19, 2004, requesting the laboratory to make every effort to meet all analytical holding times.

The holding times were met for all analyses except for pH, sulfide, and mercury (Hg) for sample B18XR8. For pH (24 hour) and sulfide (7 day), the holding times were not met because of an 8-day delay between the field sampling and delivery of the sample. For the Hg analysis, the 28-day holding time was not met because of a combination of the 8-day delay between sampling and delivery, and issues with scheduling resources and preparation of the fume hoods for the laboratory outage.

#### 5.0 ANALYTICAL RESULTS

The Data Summary Report, included as Attachment 2, presents the analytical results for the requested analytes. In this table, solid samples that were prepared by water digest are indicated with a "W" in the aliquot class (A#) column, and an "S" indicates a distillation preparation was used. An "A" indicates an acid digest of a solid, and an "E" indicates that the stronger acid soil leach procedure was used to prepare the sample prior to analysis. If there is no letter identifier in this column, this indicates that the analysis was performed on a direct subsample with no separate preparation, or with sample preparation that was included as part of the analytical procedure steps.

Note that for most analytes, the results reported for the blank in the Data Summary Report are in the same units as indicated for the sample. However, for the ion chromatography (IC), inductively coupled plasma (ICP) spectroscopy, uranium by phosphorescence (total uranium), and ICP-mass spectrometry (ICP-MS) analyses, the results reported for the blank are actually µg/mL.

##### 5.1 VOLATILE ORGANIC COMPOUND ANALYSIS ISSUES

**Sample B18XW3 (S04M000096)**—The concentration reported for carbon tetrachloride (CCl<sub>4</sub>) exceeded the calibration range for the requested low-level VOC analysis. Therefore, the result of 260 µg/kg should be considered an estimate. Since the entire sample was used in process during the first analysis, no reanalysis was possible. Sample B18XR8 (S04M000095) was collected at the same time on the same day. This sample was submitted to the laboratory for high-level VOC analysis. No CCl<sub>4</sub> was detected in this sample at a detection limit of 240 µg/kg. For the high-level VOC analysis, some of the CCl<sub>4</sub> might have been lost due to the required process of opening the En Core® sampler to the atmosphere to transfer the sample to a vial for preserving.

**Sample B17N64 (S04M000115)**—The concentration reported for acetone exceeded the calibration range for the requested low-level VOC analysis. Therefore, the result of 170 µg/kg should be considered an estimate. Since the entire sample was used in process during the first analysis, no reanalysis was possible. Sample B17N68 (S04M000116) was collected at the same time on the same day. This sample was submitted to the laboratory for high-level VOC analysis. Acetone was detected at 660 µg/kg, but the result should be considered an estimate because it is less than the estimated quantitation limit (EQL), which is 10 times the reported detection limit. For the high-level VOC analysis, some of acetone might have been lost due to the required process of opening the En Core® sampler to the atmosphere to transfer the sample to a vial for preserving.

**Sample B191Y4 (S04M000118)**—The concentration reported for CCl<sub>4</sub> exceeded the calibration range for the aliquot that was preserved for low-level VOC analysis. Therefore, the result of 290 µg/kg should be considered an estimate. Since opening the sample vial greatly compromises low-level VOC analysis, no low-level reanalysis was requested. Sample B191Y4-A (S04M000123) was an aliquot removed from the same sample vial and preserved for high-level VOC analysis. For this analysis, CCl<sub>4</sub> was not detected at a detection limit of 130 µg/kg. Again, opening the vial may have compromised the analysis due to loss of analyte to the atmosphere. No reanalysis was requested.

## 6.0 QUALITY CONTROL RESULTS

### 6.1 LABORATORY CONTROL SAMPLES

For nonradionuclide analyses, the accuracy of the analysis was evaluated from the recovery of both a laboratory control sample (LCS) and an MS. The requested accuracy was LCS or MS within 70-130% recovery. For radionuclides, the accuracy of the gross (or total) alpha, gross (or total) beta, and ICP-MS analytes was evaluated from the LCS and MS recoveries. For all other radionuclide analyses, the accuracy was evaluated only from the LCS recovery. The requested radionuclide accuracy was LCS or MS within 80-120% recovery.

For the VOC analysis, a ketone mix containing acetone, 2-butanone, and 4-methyl-2-pentanone were part of the standard mix used for LCS analysis for sample B16N61 in addition to the requested set of compounds indicated in the letters from H. L. Anastos (References 3 and 4 in the cover letter). These compounds are part of the quality control (QC) protocol associated with an unrelated project. Although the LCS and MS recoveries for ketones were not required to be reported, they are included in the Data Summary Report (Attachment 2) for sample B17N61 only.

All LCS recoveries were acceptable in accordance with the analytical instructions and the 222-S Laboratory Quality Assurance Plan (QAPP-016) (Reference 1 in the cover letter).

### 6.2 METHOD AND PREPARATION BLANKS

For most analyses, no analytes were detected in the method or preparation blank. However, the following analytes were detected in the blanks prepared and analyzed with the samples.



- a. Chromium (Cr) and lead (Pb) were detected in the acid digest blank analyzed with sample B18XR8. The level of Cr measured in the blank was about 60% of the concentration measured in the sample. The level Pb measured in the blank was about 10% of that measured in the sample. The sample was reprepared and reanalyzed and the reanalysis results confirmed that the original sample results were not affected by the contamination detected in the blank. The reanalysis was not reported because a larger sample size was used, which may have caused incomplete digestion of some analytes. This issue did not affect the comparison of the Cr and Pb results between the two digests.
- b. Uranium (U) was detected in the blank that was prepared and analyzed with sample B18XR8 for total U. The level of U detected in the blank was about 9% of that detected in the sample. The reported results are considered estimates because they are less than 10 times the reported detection limit. They should also be considered biased high due to contamination. If the results are corrected for the high bias, they are confirmed by the sum of the U isotopes reported from the ICP-MS analysis. The sample was not reanalyzed because they were in agreement with the ICP-MS and because they would still be reported as estimates on a reanalysis due to the large dilution required to reduce matrix interference.
- c. Thorium-232, <sup>235</sup>U, and <sup>238</sup>U were detected in the blank prepared and analyzed with sample B18XR8 by ICP-MS. For all three analytes, the level detected in the blank was considered insignificant because it was less than 5% of the concentration reported for the sample, as allowed by QAPP-016.
- d. Beta activity was detected in the blank prepared and analyzed with sample B18XR8 for total beta. However, the contamination was considered insignificant because the blank activity was less than 5% of the activity in the sample, as allowed by QAPP-016.
- e. Nitrite (NO<sub>2</sub>) was detected in the water digest preparation blank analyzed with sample B18XR8. However, the contamination was considered insignificant because no NO<sub>2</sub> was detected in the sample.
- f. Acetone was detected in the blanks analyzed with samples B18XR8 (S04M000095) (high-level VOC), B18XW3 (S04M000096) (low-level VOC), and B17N64-A (S04M000124) (low-level VOC). For sample B18XR8, no acetone was detected in the sample, so the blank contamination was considered insignificant. For sample B17N64-A, the blank result was less than the EQL and was considered insignificant. But for sample B18XW3, the acetone concentration reported for the blank was greater than the EQL and was about 20% of the sample concentration. For this sample, since the entire sample was used in process during the first analysis, no reanalysis was possible. Therefore, the acetone result should be considered biased high for B18XW3.
- g. Low levels of 2-butanone were detected in the blanks analyzed with samples B18XW3 (S04M000096) (low-level VOC) and B17N64-A (S04M000124) (low-level VOC). In both instances, the blank result was less than the EQL and was considered insignificant.

### 6.3 DUPLICATE ANALYSES

One duplicate analysis was performed for each analyte for each SDG. The requested precision for analysis was an RPD  $\pm 20\%$  for radionuclides and  $\pm 30\%$  for all other methods. For VOC, SVOA, and PCB analyzed, the analysis precision was determined by calculating the RPD between an MS and MSD. These are discussed in Section 6.4.

In addition to the RPDs requested in the analytical instructions, QAPP-016 states that the RPD criterion is not applicable when the sample results are less than 10 times the reported detection limit for nonradionuclide analyses or if the counting uncertainty is greater than 15% for radionuclide analyses. Although total U and Cl had RPDs greater than 30% and  $^{233}\text{U}$  and  $^{234}\text{U}$  had RPDs greater than 20%, the sample results were all less than 10 times the reported detection limits. For  $^{90}\text{Sr}$ , the RPD was also greater than 20%, but the counting uncertainty was greater than 15%. All other analyte results met RPD criteria stated in the analytical instruction.

### 6.4 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE

Where applicable, one MS sample was analyzed for each analyte for each SDG. For the VOC analysis, the samples were batched based on when they were received. High-level and low-level samples were analyzed in separate batches. One MS and one MSD was analyzed for each analytical batch. The SDGs were batched as indicated below.

- a. Batch 1      Low-level batch:  
SDG 222S20040061 only - B17N61 (S04M000022) was the only sample in this batch; MS and MSD analyzed with this sample.
- b. Batch 2      High-level batch:  
SDG 222S20040073 only - B18XR8 (S04M000095) was the only high-level sample in this batch; MS and MSD analyzed with this sample.
- c. Batch 3      Low-level batch:  
SDG 222S20040073 only - B18XW3 (S04M000096) was the only low-level sample in this batch; MS and MSD analyzed with this sample.
- d. Batch 4      Low-level batch:  
SDG 222S20040100 - B17N64 (S04M000115); MS and MSD analyzed with this sample.  
SDG 222S20040101 - B191Y4 (S04M000118); no additional QC run with this sample.
- e. Batch 5      Low-level batch:  
SDG 222S20040100 - B17N64-A (S04M000124); this was an additional analysis request for this sample based on variation of colors of the soil in the five vials received. There were insufficient vials available to provide additional QC for this sample.

- f. Batch 6      High-level batch:  
SDG 222S20040100 – B17N68 (S04M000116); MS and MSD analyzed with this sample.  
SDG222S20040101 –B191Y4-A (S04M000123); no additional QC run with this sample.

For nonradionuclide analyses, the accuracy of the analysis was evaluated from both the LCS and MS recoveries. The requested accuracy was LCS or MS within 70-130% recovery. An MS analysis was not applicable for the pH analysis. For the SVOA and VOC analyses, the analytical instructions requested that the laboratory report MS recoveries only for the representative set of compounds indicated in the letters from H. L. Anastos (References 3 and 4 in the cover letter). For PCB analysis, only Aroclor-1254 is included in the MS because it is the aroclor most commonly detected in samples on the Hanford site. All analytes met the accuracy criterion stated in the analytical instructions.

In addition to the MS analysis, an MSD was analyzed with the SVOA, VOC, and PCB analyses to evaluate method precision. The spike RPD between the MS and MSD met the precision criterion for all analyses.

For the VOC analysis, a ketone mix containing acetone, 2-butanone, and 4-methyl-2-pentanone were part of the standard mix used for MS analysis for sample B17N61 in addition to those compounds listed in the Anastos letters. These compounds are part of the QC protocol associated with an unrelated project. Although the ketones were not required to be reported, they are included in the Data Summary Report for B17N61 only, but they are not included in the MS/MSD evaluation.

For radionuclides, the accuracy of the gross (or total) alpha, gross (or total) beta, and ICP-MS analytes was evaluated from the LCS and MS recoveries. For all other radionuclide analyses, the accuracy was evaluated only from the LCS, which is discussed in Section 6.1. The requested radionuclide accuracy was LCS or MS within 80-120% recovery. All analytes met the accuracy criterion stated in the analytical instructions.

The Data Summary Report included as Attachment 2 does not report the recoveries for the MSD analysis or the RPD for the MS/MSD analysis. This information is provided in Table 1 through Table 5 for VOA, Table 6 for SVOA, and Table 7 for PCB analysis.

**Table 1. MS/MSD Recoveries and RPD for VOA for B17N61.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	88	88	0
Chlorobenzene	90	88	2
1,1-Dichloroethene	70	75	7
Toluene	87	86	1
Trichloroethene	88	88	0

**Table 2. MS/MSD Recoveries and RPD for VOA for B18XW3.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	101	102	1
Chlorobenzene	99	101	2
1,1-Dichloroethene	94	93	1
Toluene	95	98	3
Trichloroethene	102	102	0

**Table 3. MS/MSD Recoveries and RPD for VOA for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	91	91	0
Chlorobenzene	91	91	0
1,1-Dichloroethene	92	106	14
Toluene	89	89	0
Trichloroethene	89	88	1

**Table 4. MS/MSD Recoveries and RPD for VOA for B17N64.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	102	103	1
Chlorobenzene	100	100	0
1,1-Dichloroethene	94	92	2
Toluene	94	94	0
Trichloroethene	100	102	2

**Table 5. MS/MSD Recoveries and RPD for VOA for B17N68.**

Compound	MS (%)	MSD (%)	RPD (%)
Benzene	99	109	10
Chlorobenzene	109	114	4
1,1-Dichloroethene	85	84	1
Toluene	106	117	10
Trichloroethene	91	96	5

**Table 6. MS/MSD Recoveries and RPD for SVOA for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Phenol	87	92	6
2-Chlorophenol	81	84	4
1,4-Dichlorobenzene	75	83	10
N-Nitroso-di-n-propylamine	82	88	7
1,2,4-Trichlorobenzene	83	90	8
4-Chloro-3-methylphenol	85	88	3
Acenaphthene	87	92	6
4-Nitrophenol	86	89	3
2,4-Dinitrotoluene	80	85	6
Pentachlorophenol	72	76	5
Pyrene	79	86	8

**Table 7. MS/MSD Recoveries and RPD for PCB for B18XR8.**

Compound	MS (%)	MSD (%)	RPD (%)
Aroclor 1254	86	87	1

## 6.5 SURROGATE RECOVERIES

Surrogate standards are added to all field and QC samples for VOC, SVOA, and PCB analyses. The surrogate is added to monitor total method recovery through preparation, sample matrix cleanup, and analysis. All surrogate standard recoveries met the requirements in QAPP-016.

## 6.6 OPPORTUNISTIC ANALYTES

The VOC analysis contains results for compounds that were calibrated for in the method but were not requested in the analytical instructions. These results are considered "opportunistic" rather than tentatively identified compounds (TIC) because the results are more accurate. The calculated results, chemical abstract system (CAS) numbers, and method detection limits (MDL) for these compounds are presented in Table 8. The MDLs are included in parentheses after the sample results. Results that should be considered estimated because the concentration was not greater than 10 times the MDL are indicated with a (J) and those that are estimated because the concentration exceeded the calibration range are indicated with an (E).

10

Compound	CAS#	Units	B17N61	B18XW3	B17N64	B17N64-A	B191Y4-A	B191Y4
n-Butanol	71-36-3	µg/kg	260 (25)	1500 (20) (E)	ND	301 (19)	ND	947 (22) (E)
Tetrahydrofuran	109-99-9	µg/kg	9.6 (2.2) (J)	112 (1.8)	93 (2.4)	36 (1.7)	ND	51 (2.0)
2-Hexanone	591-78-6	µg/kg	ND	1.3 (0.6) (J)	1.3 (0.8) (J)	7.6 (0.6)	ND	1.5 (0.6) (J)
2-Pentanone	107-87-9	µg/kg	ND	ND	6.6 (2.4) (J)	6.0 (1.7) (J)	ND	ND
Carbon disulfide	75-15-0	µg/kg	ND	ND	ND	ND	ND	11 (0.9)
Styrene	100-42-5	µg/kg	ND	ND	ND	ND	ND	2.9 (0.7) (J)
1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	ND	ND	ND	ND	ND	588 (75) (J)

ND--Not detected.

一、  
 二、  
 三、  
 四、  
 五、  
 六、  
 七、

For sample B17N61 (S04M000022), three opportunistic VOC compounds were reported in the preliminary report as detected in the sample. However, further examination of the data determined that methyl acetate was detected in most of the blanks, LCS, and samples. Therefore, that compound was considered to be contamination from an unknown source and not related to the sample matrix. The result is not included in this section of the report.

## 6.7 TENTATIVELY IDENTIFIED COMPOUNDS

The analytical instructions (Reference 2) list five compounds for VOC analysis that the laboratory does not routinely report, as indicated in the letter from H. L. Anastos (Reference 4). The laboratory was requested to perform a TIC search for these compounds. These compounds were not detected in any of the samples.

Several other TICs were identified in the samples. The TICs are identified by the instrument library search based only on masses in the spectra and are not based on retention times or verified with independent check standards. These compounds could be misidentified because of matrix effects. The concentrations are estimated based only on the nearest internal standard and a presumed response factor of 1. The TIC results are presented in Table 9.

For sample B17N61 (S04M000022), the preliminary report indicated that three TICs were identified during the VOC analysis. However, further examination of the data determined that cyclotetrasiloxane, octamethyl was detected in most of the blanks, LCS, and samples. Therefore, that compound was considered to be contamination from an unknown source and not related to the sample matrix. The result is not included in this section of the report.

## 6.8 TARGET QUANTITATION LIMITS

The analytical instructions listed target quantitation limits (TQL) for each requested analyte except mercury. The Data Summary Report provides MDLs. These must be converted to EQL to compare these to the requested TQLs. For all of the inorganic methods, the EQL is calculated as 10 times the reported MDL. The radionuclide analyses use several different conversion factors for determining the EQL. For gamma energy analysis (GEA) and  $^{237}\text{Np}$ , the EQL is five times the reported MDL. For total alpha, total beta and  $^{90}\text{Sr}$ , the EQL is three times the reported MDL. For the determination of isotopic plutonium and americium by alpha energy analysis, the MDL is the EQL.

The laboratory was unable to meet all of the requested TQLs due to necessary dilutions of the samples. These dilutions ensured analyte concentrations did not exceed calibration ranges and avoided contamination and carry-over problems. For radionuclide analysis, sample sizes were chosen based on allowable activity in a sample that is allowed in the counting room, or level of activity compared to the standard amount of tracer added, or a sample size limit in the procedure. The laboratory used the largest feasible sample sizes to obtain the lowest detection limits possible for these analyses.

Table 9. Tentatively Identified Compounds from VOC Analysis.

Compound	CAS#	Units	B17N61	B18XW3	B17N64	B17N64-A	B191Y4
2-Propanol, 2-methyl- (tert-butanol)	75-65-0	µg/kg	4.3	ND	ND	ND	ND
1-Hexanol, 2-ethyl	104-76-7	µg/kg	8.5	ND	ND	ND	ND
Butanal	123-72-8	µg/kg	ND	18	ND	ND	ND
Methane, nitro	75-52-5	µg/kg	ND	5.5	ND	ND	ND
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl)-	719-22-2	µg/kg	ND	4.5	6.2	ND	ND
1-Hexanol, 2-ethyl	104-76-7	µg/kg	ND	24	ND	12	ND
Ethane, hexachloro	67-72-1	µg/kg	ND	5.2	ND	15	ND
Isopropyl alcohol	67-63-0	µg/kg	ND	ND	ND	ND	10
Pentanal	110-62-3	µg/kg	ND	ND	ND	8.9	ND
Hexanal	66-25-1	µg/kg	ND	ND	ND	13	ND
Ethene, tribromo	598-16-3	µg/kg	ND	ND	ND	5.7	ND
Benzoic acid, 2-[(trimethylsilyl)oxy]-, trimethylsilyl ester	3789-85-3	µg/kg	ND	ND	ND	ND	6.3

ND— Not detected.



## 7.0 ANALYTICAL PROCEDURES

Table 10 presents the 222-S Laboratory analytical procedures used to generate the reported results.

**Table 10. Analytical Procedures.**

Analysis	Preparation Procedure	Analysis Procedure
<b>Inorganic Analyses</b>		
pH	Direct	LA-212-105 Rev. D-0
Hg	Direct	LA-325-106 Rev. C-0
CN	Direct	LA-695-102 Rev. I-2
NH <sub>4</sub>	Distillation	LA-533-101 Rev. K-0
IC	Water digest	LA-533-107 Rev. C-2
Sulfide	Direct	LA-361-101 Rev. A-2
Total U	Acid digest	LA-925-009 Rev. D-5
ICP	Acid digest	LA-505-161 Rev. D-1
ICP-MS	Acid digest	LA-506-102 Rev. A-0
<b>Radiochemical Analyses</b>		
Total alpha/total beta	Environmental digest	LA-508-101 Rev. I-1
GEA	Environmental digest	LA-548-121 Rev. F-5
<sup>90</sup> Sr	Environmental digest	LA-220-103 Rev. F-10
<sup>237</sup> Np	Environmental digest	LA-933-141 Rev. H-7
<sup>238</sup> Pu, <sup>239/240</sup> Pu	Environmental digest	LA-953-104 Rev. D-1
<sup>241</sup> Am	Environmental digest	LA-953-104 Rev. D-1
<b>Organic Analyses</b>		
VOA	Direct	LA-523-118 Rev. A-2
SVOA	Organic extraction	LA-523-135 Rev. A-2
PCB	Organic extraction	LA-523-140 Rev. B-0

**Notes:**

Acid digest procedure: LA-505-163 Rev. D-2  
 Water digest procedure: LA-504-101 Rev. I-0  
 Distillation procedure: LA-544-112 Rev. A-1

Environmental acid digest procedure: LA-544-101 Rev. C-5  
 Organic extraction procedure: LA-523-138 Rev. D-0

CH2M-0401824

Attachment 2

DATA SUMMARY REPORT

Consisting of 12 pages, including coversheet

0000018

Attachment 2  
29 TRENCH4

CORE NUMBER: 222S20040061  
SEGMENT #: B17N61

SEGMENT PORTION: VOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000022			Vinyl Chloride	ug/Kg	n/a	<1.5	<1.7	n/a	n/a	n/a	n/a	2	n/a
S04M000022			Chloromethane	ug/Kg	n/a	<1.6	<1.8	n/a	n/a	n/a	n/a	2	n/a
S04M000022			Methylene Chloride	ug/Kg	n/a	<1.3	<1.4	n/a	n/a	n/a	n/a	1	n/a
S04M000022			Acetone	ug/Kg	1.1e+02	<0.92	26	n/a	n/a	n/a	1.1e+02	1	n/a
S04M000022			1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.88	n/a	n/a	n/a	n/a	0.9	n/a
S04M000022			1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.5	n/a	n/a	n/a	n/a	1	n/a
S04M000022			Chloroform	ug/Kg	n/a	<0.72	0.96	n/a	n/a	n/a	n/a	0.8	n/a
S04M000022			1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.84	n/a	n/a	n/a	n/a	0.8	n/a
S04M000022			2-Butanone	ug/Kg	1.1e+02	<0.82	36	n/a	n/a	n/a	1.0e+02	0.9	n/a
S04M000022			1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.77	n/a	n/a	n/a	n/a	0.8	n/a
S04M000022			Carbon Tetrachloride	ug/Kg	n/a	<1.3	19	n/a	n/a	n/a	n/a	1	n/a
S04M000022			Trichloroethene	ug/Kg	90	<0.86	<0.95	n/a	n/a	n/a	88	0.9	n/a
S04M000022			Benzene	ug/Kg	88	<0.66	<0.73	n/a	n/a	n/a	88	0.7	n/a
S04M000022			4-Methyl-2-pentanone	ug/Kg	1.0e+02	<0.74	<0.82	n/a	n/a	n/a	1.0e+02	0.8	n/a
S04M000022			Tetrachloroethene	ug/Kg	n/a	<0.70	<0.77	n/a	n/a	n/a	n/a	0.8	n/a
S04M000022			Toluene	ug/Kg	86	<0.64	<0.71	n/a	n/a	n/a	87	0.7	n/a
S04M000022			Chlorobenzene	ug/Kg	91	<0.76	<0.84	n/a	n/a	n/a	90	0.8	n/a
S04M000022			Ethylbenzene	ug/Kg	n/a	<0.98	<1.1	n/a	n/a	n/a	n/a	1	n/a
S04M000022			Xylenes (total)	ug/Kg	n/a	<1.6	<1.8	n/a	n/a	n/a	n/a	2	n/a
S04M000022			1,1-Dichloroethene	ug/Kg	73	<0.76	<0.84	n/a	n/a	n/a	70	0.8	n/a

3100000

Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222S20040073  
SEGMENT #: B18XR8

SEGMENT PORTION: Acid Digest

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000103	A		Silver -ICP-Acid Digest	ug/g	95.8	<4.00e-03	<0.743	0.924	n/a	n/a	94.5	0.74	n/a
S04M000103	A		Arsenic -ICP-Acid Digest	ug/g	113	<0.0514	<9.55	<9.63	n/a	n/a	111	9.6	n/a
S04M000103	A		Barium -ICP-Acid Digest	ug/g	97.8	<7.30e-03	43.4	46.7	45.1	7.42	96.9	1.4	n/a
S04M000103	A		Beryllium -ICP-Acid Digest	ug/g	103	<7.70e-03	<1.43	<1.44	n/a	n/a	102	1.4	n/a
S04M000103	A		Bismuth -ICP-Acid Digest	ug/g	94.9	<0.0508	<9.44	<9.52	n/a	n/a	94.6	9.4	n/a
S04M000103	A		Cadmium -ICP-Acid Digest	ug/g	94.6	<4.20e-03	11.7	13.0	12.4	10.5	92.4	0.78	n/a
S04M000103	A		Chromium -ICP-Acid Digest	ug/g	97.3	0.0496	15.5	15.1	15.3	2.34	95.5	2.7	n/a
S04M000103	A		Copper -ICP-Acid Digest	ug/g	97.6	<7.90e-03	13.2	13.7	13.4	3.63	96.4	1.5	n/a
S04M000103	A		Lithium -ICP-Acid Digest	ug/g	100	<8.10e-03	10.4	11.3	10.8	8.29	99.6	1.5	n/a
S04M000103	A		Manganese -ICP-Acid Digest	ug/g	95.5	<3.40e-03	310	336	323	8.22	95.9	0.63	n/a
S04M000103	A		Nickel -ICP-Acid Digest	ug/g	97.4	0.0142	25.4	27.4	26.4	7.45	94.5	2.3	n/a
S04M000103	A		Phosphorus -ICP-Acid Digest	ug/g	95.9	<0.0556	533	557	545	4.26	98.8	10	n/a
S04M000103	A		Lead -ICP-Acid Digest	ug/g	91.4	<0.0246	5.76	7.11	6.44	20.9	89.8	4.6	n/a
S04M000103	A		Antimony -ICP-Acid Digest	ug/g	93.3	<0.0502	<9.32	<9.41	n/a	n/a	79.5	9.3	n/a
S04M000103	A		Selenium -ICP-Acid Digest	ug/g	96.8	<0.0494	<9.18	<9.26	n/a	n/a	96.4	9.2	n/a
S04M000103	A		Strontium -ICP-Acid Digest	ug/g	99.6	<3.30e-03	15.2	17.3	16.3	13.0	98.4	0.61	n/a
S04M000103	A		Zinc -ICP-Acid Digest	ug/g	92.3	<6.90e-03	42.3	42.6	42.4	0.808	91.3	1.3	n/a

SEGMENT PORTION: Environmental Acid Digest

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000104	E		Uranium by Phosphorescence	ug/g	94.8	5.66e-03	1.22	1.66	1.44	30.6	80.4	0.83	n/a
S04M000104	E		Pu-239/240 by TRU-SPEC Resin	uCi/g	90.9	<1.22e-04	2.26e-03	2.61e-03	2.44e-03	14.4	n/a	1.3e-04	2.0
S04M000104	E		Pu-238 by TRU-SPEC Resin IonEx	uCi/g	n/a	<1.31e-04	6.57e-04	5.45e-04	6.01e-04	18.6	n/a	1.4e-04	2.8
S04M000104	E		Np237 by TTA Extraction	uCi/g	103	<2.34e-05	2.89e-05	2.45e-05	2.67e-05	16.5	n/a	3.8e-05	80
S04M000104	E		Thorium-232 by ICP/MS	ug/g	103	0.319	6.36	5.71	6.04	10.7	94.2	9.6e-04	n/a
S04M000104	E		Uranium-233 by ICP/MS Acid Dig	ug/g	n/a	<3.60e-03	3.24e-04	2.53e-04	2.88e-04	24.5	n/a	7.2e-05	n/a
S04M000104	E		Uranium-234 by ICP/MS Acid Dig	ug/g	n/a	<1.20e-03	6.78e-05	5.44e-05	6.11e-05	22.0	n/a	2.4e-05	n/a
S04M000104	E		Uranium-235 by ICP/MS Acid Dig	ug/g	99.9	9.74e-03	6.79e-03	6.44e-03	6.62e-03	5.39	109	8.8e-05	n/a
S04M000104	E		Uranium-238 by ICP/MS Acid Dig	ug/g	101	1.38	0.922	0.910	0.916	1.35	98.5	4.4e-03	n/a
S04M000104	E		Cobalt-60 by GEA	uCi/g	103	<1.37e-05	<1.53e-05	<1.37e-05	n/a	n/a	n/a	1.5e-05	n/a
S04M000104	E		Antimony-125 by GEA	uCi/g	n/a	<3.69e-05	<3.47e-05	<3.75e-05	n/a	n/a	n/a	3.5e-05	n/a
S04M000104	E		Cesium-134 by GEA	uCi/g	n/a	<1.10e-05	<1.25e-05	<1.20e-05	n/a	n/a	n/a	1.3e-05	n/a
S04M000104	E		Cesium-137 by GEA	uCi/g	108	7.09e-05	<2.61e-05	<2.54e-05	n/a	n/a	n/a	2.6e-05	n/a
S04M000104	E		Europium-152 by GEA	uCi/g	n/a	<1.96e-05	<2.07e-05	<2.12e-05	n/a	n/a	n/a	2.1e-05	n/a
S04M000104	E		Europium-154 by GEA	uCi/g	n/a	<4.87e-05	<4.40e-05	<4.77e-05	n/a	n/a	n/a	4.4e-05	n/a
S04M000104	E		Europium-155 by GEA	uCi/g	n/a	<1.68e-05	<2.06e-05	<2.11e-05	n/a	n/a	n/a	2.1e-05	n/a
S04M000104	E		Am-241 by TRU-SPEC Resin IonEx	uCi/g	104	<0.0166	0.309	0.299	0.304	3.29	n/a	0.032	2.3
S04M000104	E		Alpha Env. Solids/Misc	uCi/g	100	<6.51e-05	0.296	0.279	0.288	5.91	85.8	1.5e-04	1.2
S04M000104	E		Beta In Env. Solids/Misc	uCi/g	109	1.84e-03	0.0548	0.0509	0.0528	7.38	108	4.2e-04	2.4
S04M000228	E		Sr-89/90 Env. Solids	uCi/g	101	<4.05e-07	7.41e-07	5.08e-07	6.24e-07	37.3	n/a	7.9e-07	82

00000000

SEGMENT PORTION: NH4 Distillation

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000105	S	Ammonium Ion-IC-Dionex 100	ug/g	103	<0.100	192	161	177	17.8	83.6	1.1e+02	n/a

SEGMENT PORTION: PCB

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000107		Aroclor-1016WEI by SW-846 8082	ug/Kg	n/a	<16	<39	n/a	n/a	n/a	n/a	4.e+01	n/a
S04M000107		Aroclor-1221WEI by SW-846 8082	ug/Kg	n/a	<5.2	<12	n/a	n/a	n/a	n/a	1.e+01	n/a
S04M000107		Aroclor-1232WEI by SW-846 8082	ug/Kg	n/a	<92	<2.2e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000107		Aroclor-1242WEI by SW-846 8082	ug/Kg	n/a	<17	<40	n/a	n/a	n/a	n/a	4.e+01	n/a
S04M000107		Aroclor-1248WEI by SW-846 8082	ug/Kg	n/a	<5.3	<13	n/a	n/a	n/a	n/a	1.e+01	n/a
S04M000107		Aroclor-1254WEI by SW-846 8082	ug/Kg	84	<3.1	<7.4	n/a	n/a	n/a	n/a	86	7
S04M000107		Aroclor-1260WEI by SW-846 8082	ug/Kg	n/a	<23	<54	n/a	n/a	n/a	n/a	5.e+01	n/a

SEGMENT PORTION: Parent

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000101		Cyanide Water Distillation	ug/g	102	<0.550	<0.451	<0.405	n/a	n/a	99.0	0.45	n/a
S04M000101		Mercury by CVAA (PE) with FIAS	ug/g	104	<1.00e-04	0.0900	0.0960	0.0930	6.45	98.0	0.040	n/a
S04M000101		pH on Solid Samples	pH	n/a	n/a	5.97	5.99	5.98	0.334	n/a	0.010	n/a
S04M000101		Sulfide by Microdiat. & ISE	ug/g	90.7	<0.158	<14.6	14.6	n/a	n/a	87.2	15	n/a

SEGMENT PORTION: SVOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000106		Pentachlorophenol	ug/Kg	74	<4.0e+02	<9.6e+02	n/a	n/a	n/a	72	1.e+03	n/a
S04M000106		Phenol	ug/Kg	86	<4.0e+02	<9.6e+02	n/a	n/a	n/a	87	1.e+03	n/a
S04M000106		2-Chlorophenol	ug/Kg	80	<4.0e+02	<9.6e+02	n/a	n/a	n/a	81	1.e+03	n/a
S04M000106		Pyrene	ug/Kg	91	<4.0e+02	<9.6e+02	n/a	n/a	n/a	79	1.e+03	n/a
S04M000106		N-Nitroso-di-n-propylamine	ug/Kg	86	<4.0e+02	<9.6e+02	n/a	n/a	n/a	82	1.e+03	n/a
S04M000106		1,2,4-Trichlorobenzene SV	ug/Kg	89	<4.0e+02	<9.6e+02	n/a	n/a	n/a	83	1.e+03	n/a
S04M000106		4-Chloro-3-methylphenol	ug/Kg	85	<4.0e+02	<9.6e+02	n/a	n/a	n/a	85	1.e+03	n/a
S04M000106		Acenaphthene	ug/Kg	94	<4.0e+02	<9.6e+02	n/a	n/a	n/a	88	1.e+03	n/a
S04M000106		4-Nitrophenol	ug/Kg	83	<4.0e+02	<9.6e+02	n/a	n/a	n/a	86	1.e+03	n/a
S04M000106		2,4-Dinitrotoluene	ug/Kg	85	<4.0e+02	<9.6e+02	n/a	n/a	n/a	81	1.e+03	n/a
S04M000106		2-Methylphenol	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a
S04M000106		3 & 4 Methylphenol Total	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a
S04M000106		1,4-Dichlorobenzene	ug/Kg	84	<4.0e+02	<9.6e+02	n/a	n/a	n/a	75	1.e+03	n/a
S04M000106		Tri-n-butylphosphate	ug/Kg	n/a	<4.0e+02	<9.6e+02	n/a	n/a	n/a	n/a	1.e+03	n/a

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000095		Vinyl Chloride	ug/Kg	n/a	<6.0e+02	<5.6e+02	n/a	n/a	n/a	n/a	6.e+02	n/a
S04M000095		Chloromethane	ug/Kg	n/a	<6.6e+02	<6.2e+02	n/a	n/a	n/a	n/a	6.e+02	n/a
S04M000095		Methylene Chloride	ug/Kg	n/a	<2.5e+02	<2.4e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095		Acetone	ug/Kg	n/a	8.5e+02	<1.7e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095		1,1-Dichloroethane	ug/Kg	n/a	<3.2e+02	<3.0e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095		1,2-Dichloroethene (cis & trans)	ug/Kg	n/a	<2.8e+02	<2.6e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095		Chloroform	ug/Kg	n/a	<1.4e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a

1200000

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000095			1,2-Dichloroethane	ug/Kg	n/a	<1.5e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095			2-Butanone	ug/Kg	n/a	<1.6e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095			1,1,1-Trichloroethane	ug/Kg	n/a	<1.4e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095			Carbon Tetrachloride	ug/Kg	n/a	<2.6e+02	<2.4e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095			Trichloroethene	ug/Kg	1.0e+02	<1.7e+02	<1.6e+02	n/a	n/a	n/a	89	2.e+02	n/a
S04M000095			Benzene	ug/Kg	1.0e+02	<1.3e+02	<1.2e+02	n/a	n/a	n/a	91	1.e+02	n/a
S04M000095			4-Methyl-2-pentanone	ug/Kg	n/a	<1.5e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095			Tetrachloroethene	ug/Kg	n/a	<1.4e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a
S04M000095			Toluene	ug/Kg	96	<1.3e+02	<1.2e+02	n/a	n/a	n/a	89	1.e+02	n/a
S04M000095			Chlorobenzene	ug/Kg	1.0e+02	<1.5e+02	<1.4e+02	n/a	n/a	n/a	91	1.e+02	n/a
S04M000095			Ethylbenzene	ug/Kg	n/a	<2.0e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a
S04M000095			Xylenes (total)	ug/Kg	n/a	<3.2e+02	<3.0e+02	n/a	n/a	n/a	n/a	3.e+02	n/a
S04M000095			1,1-Dichloroethene	ug/Kg	1.2e+02	<1.5e+02	<1.4e+02	n/a	n/a	n/a	92	1.e+02	n/a

SEGMENT PORTION: Water Digest

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000102	W		Fluoride IC SW846	ug/g	97.6	<0.0120	<24.9	<24.7	n/a	n/a	102	25	n/a
S04M000102	W		Chloride SW-846	ug/g	94.0	<0.0170	39.7	61.7	50.7	43.5	95.2	35	n/a
S04M000102	W		Nitrite IC SW846	ug/g	96.0	0.130	<224	<222	n/a	n/a	96.4	2.2e+02	n/a
S04M000102	W		Nitrate by IC SW846	ug/g	98.4	<0.139	5.91e+03	6.26e+03	6.09e+03	5.75	101	2.9e+02	n/a
S04M000102	W		Phosphate by IC SW846	ug/g	98.5	<0.120	<249	<247	n/a	n/a	98.3	2.5e+02	n/a
S04M000102	W		Sulfate by IC SW846	ug/g	95.8	<0.138	<287	<284	n/a	n/a	97.8	2.9e+02	n/a

20000000

Attachment 2  
29 TRENCH  
Data Summary Report

CORE NUMBER: 222S20040073  
SEGMENT #: B18XU3

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000096		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.3	n/a	n/a	n/a	n/a	1	n/a
S04M000096		Chloromethane	ug/Kg	n/a	<1.6	<1.5	n/a	n/a	n/a	n/a	1	n/a
S04M000096		Methylene Chloride	ug/Kg	n/a	<1.3	<1.1	n/a	n/a	n/a	n/a	1	n/a
S04M000096		Acetone	ug/Kg	n/a	10	51	n/a	n/a	n/a	n/a	0.8	n/a
S04M000096		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.72	n/a	n/a	n/a	n/a	0.7	n/a
S04M000096		1,2-Dichloroethene (cis & tran	ug/Kg	n/a	<1.4	<1.2	n/a	n/a	n/a	n/a	1	n/a
S04M000096		Chloroform	ug/Kg	n/a	<0.72	15	n/a	n/a	n/a	n/a	0.6	n/a
S04M000096		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.68	n/a	n/a	n/a	n/a	0.7	n/a
S04M000096		2-Butanone	ug/Kg	n/a	0.94	27	n/a	n/a	n/a	n/a	0.7	n/a
S04M000096		1,1,1-Trichloroethene	ug/Kg	n/a	<0.70	<0.63	n/a	n/a	n/a	n/a	0.6	n/a
S04M000096		Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.6e+02	n/a	n/a	n/a	n/a	1	n/a
S04M000096		Trichloroethene	ug/Kg	1.0e+02	<0.86	<0.77	n/a	n/a	n/a	1.0e+02	0.8	n/a
S04M000096		Benzene	ug/Kg	1.0e+02	<0.66	<0.59	n/a	n/a	n/a	1.0e+02	0.6	n/a
S04M000096		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.66	n/a	n/a	n/a	n/a	0.7	n/a
S04M000096		Tetrachloroethene	ug/Kg	n/a	<0.70	0.94	n/a	n/a	n/a	n/a	0.6	n/a
S04M000096		Toluene	ug/Kg	96	<0.64	<0.57	n/a	n/a	n/a	95	0.6	n/a
S04M000096		Chlorobenzene	ug/Kg	1.0e+02	<0.76	<0.68	n/a	n/a	n/a	99	0.7	n/a
S04M000096		Ethylbenzene	ug/Kg	n/a	<0.98	<0.88	n/a	n/a	n/a	n/a	0.9	n/a
S04M000096		Xylenes (total)	ug/Kg	n/a	<1.6	<1.4	n/a	n/a	n/a	n/a	1	n/a
S04M000096		1,1-Dichloroethene	ug/Kg	97	<0.76	<0.68	n/a	n/a	n/a	94	0.7	n/a

0000023

Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222520040073  
SEGMENT #: B19078-A *Dug* 6/23/04  
SEGMENT PORTION: Environmental Acid Digest

Sample#	R#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000108	E	Pu-239/240 by TRU-SPEC Resin	UCI/g	111	<1.26e-03	4.99e-03	5.79e-03	5.39e-03	14.8	n/a	1.3e-03	4.4
S04M000108	E	Pu-238 by TRU-SPEC Resin IonEX	UCI/g	n/a	<1.46e-03	<1.48e-03	<1.86e-03	n/a	n/a	n/a	1.5e-03	1.0e+02

0000024



Attachment 2  
29 TRENCH5  
Data Summary Report

CORE NUMBER: 222520040100

SEGMENT #: B17N64

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000115		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.8	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000115		Chloromethane	ug/Kg	n/a	<1.6	<2.0	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000115		Methylene Chloride	ug/Kg	n/a	<1.3	<1.5	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		Acetone	ug/Kg	n/a	<0.92	1.7e+02	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.96	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		1,2-Dichloroethane (cis & tran	ug/Kg	n/a	<1.4	<1.6	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000115		Chloroform	ug/Kg	n/a	<0.72	8.7	n/a	n/a	n/a	n/a	0.9	n/a	n/a
S04M000115		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.91	n/a	n/a	n/a	n/a	0.9	n/a	n/a
S04M000115		2-Butanone	ug/Kg	n/a	<0.82	75	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.84	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000115		Carbon Tetrachloride	ug/Kg	n/a	<1.3	92	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		Trichloroethene	ug/Kg	1.0e+02	<0.86	<1.0	n/a	n/a	n/a	1.0e+02	1	n/a	n/a
S04M000115		Benzene	ug/Kg	1.0e+02	<0.66	<0.79	n/a	n/a	n/a	1.0e+02	0.8	n/a	n/a
S04M000115		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	1.2	n/a	n/a	n/a	n/a	0.9	n/a	n/a
S04M000115		Tetrachloroethene	ug/Kg	n/a	<0.70	2.0	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000115		Toluene	ug/Kg	97	<0.64	1.3	n/a	n/a	n/a	94	0.8	n/a	n/a
S04M000115		Chlorobenzene	ug/Kg	1.0e+02	<0.76	<0.91	n/a	n/a	n/a	1.0e+02	0.9	n/a	n/a
S04M000115		Ethylbenzene	ug/Kg	n/a	<0.98	<1.2	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000115		Xylenes (total)	ug/Kg	n/a	<1.6	<1.9	n/a	n/a	n/a	n/a	2	n/a	n/a
S04M000115		1,1-Dichloroethane	ug/Kg	95	<0.76	<0.91	n/a	n/a	n/a	94	0.9	n/a	n/a

0000025

Attachment 2  
29 TRECHS  
Data Summary Report

CORE NUMBER: 22S20040100  
SEGMENT #: B17N64-A

SEGMENT PORTION: VOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000124			Vinyl Chloride	ug/Kg	n/a	<1.5	<1.3	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			Chloromethane	ug/Kg	n/a	<1.6	<1.4	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			Methylene Chloride	ug/Kg	n/a	<1.3	<1.1	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			Acetone	ug/Kg	n/a	7.2	79	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000124			1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.67	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124			1,2-Dichloroethane (cis & tran	ug/Kg	n/a	<1.4	<1.2	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			Chloroform	ug/Kg	n/a	<0.72	13	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			2-Butanone	ug/Kg	n/a	0.95	80	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124			1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.59	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.4e+02	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			Trichloroethene	ug/Kg	99	<0.86	<0.72	n/a	n/a	n/a	n/a	0.7	n/a	n/a
S04M000124			Benzene	ug/Kg	98	<0.66	<0.56	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.62	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			Tetrachloroethene	ug/Kg	n/a	<0.70	5.4	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			Toluene	ug/Kg	95	<0.64	<0.54	n/a	n/a	n/a	n/a	0.5	n/a	n/a
S04M000124			Chlorobenzene	ug/Kg	97	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a
S04M000124			Ethylbenzene	ug/Kg	n/a	<0.98	<0.82	n/a	n/a	n/a	n/a	0.8	n/a	n/a
S04M000124			Xylenes (total)	ug/Kg	n/a	<1.6	<1.3	n/a	n/a	n/a	n/a	1	n/a	n/a
S04M000124			1,1-Dichloroethene	ug/Kg	94	<0.76	<0.64	n/a	n/a	n/a	n/a	0.6	n/a	n/a

000000

Attachment 2  
29 TRENCH  
Data Summary Report

CORE NUMBER: 222S20040100  
SEGMENT #: B17N68

SEGMENT PORTION: VOA

Sample#	R/A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000116		Vinyl Chloride	ug/Kg	n/a	<1.5e+02	<1.7e+02	n/a	n/a	n/a	n/a	2.e+02	n/a	
S04M000116		Chloromethane	ug/Kg	n/a	<1.6e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a	
S04M000116		Methylene Chloride	ug/Kg	n/a	<1.3e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	
S04M000116		Acetone	ug/Kg	n/a	<92	6.6e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	
S04M000116		1,1-Dichloroethane	ug/Kg	n/a	<80	<89	n/a	n/a	n/a	n/a	9.e+01	n/a	
S04M000116		1,2-Dichloroethane (cis & tran	ug/Kg	n/a	<1.4e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	
S04M000116		Chloroform	ug/Kg	n/a	<72	<80	n/a	n/a	n/a	n/a	8.e+01	n/a	
S04M000116		1,2-Dichloroethane	ug/Kg	n/a	<76	<84	n/a	n/a	n/a	n/a	8.e+01	n/a	
S04M000116		2-Butanone	ug/Kg	n/a	<82	<91	n/a	n/a	n/a	n/a	9.e+01	n/a	
S04M000116		1,1,1-Trichloroethane	ug/Kg	n/a	<70	<77	n/a	n/a	n/a	n/a	8.e+01	n/a	
S04M000116		Carbon Tetrachloride	ug/Kg	n/a	<1.3e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	
S04M000116		Trichloroethene	ug/Kg	83	<86	<95	n/a	n/a	n/a	91	9.e+01	n/a	
S04M000116		Benzene	ug/Kg	94	<66	<73	n/a	n/a	n/a	1.0e+02	7.e+01	n/a	
S04M000116		4-Methyl-2-pentanone	ug/Kg	n/a	<74	<82	n/a	n/a	n/a	n/a	8.e+01	n/a	
S04M000116		Tetrachloroethene	ug/Kg	n/a	<70	<77	n/a	n/a	n/a	n/a	8.e+01	n/a	
S04M000116		Toluene	ug/Kg	1.0e+02	<64	<71	n/a	n/a	n/a	1.1e+02	7.e+01	n/a	
S04M000116		Chlorobenzene	ug/Kg	99	<76	<84	n/a	n/a	n/a	1.1e+02	8.e+01	n/a	
S04M000116		Ethylbenzene	ug/Kg	n/a	<98	<1.1e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	
S04M000116		Xylenes (total)	ug/Kg	n/a	<1.6e+02	<1.8e+02	n/a	n/a	n/a	n/a	2.e+02	n/a	
S04M000116		1,1-Dichloroethene	ug/Kg	79	<76	<84	n/a	n/a	n/a	85	8.e+01	n/a	

250000

Attachment 2  
Z9 TRENCMS  
Data Summary Report

CORE NUMBER: 222S20040101

SEGMENT #: B191Y4

SEGMENT PORTION: VOA

Sample#	R A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S04M000118		Vinyl Chloride	ug/Kg	n/a	<1.5	<1.5	n/a	n/a	n/a	n/a	1	n/a
S04M000118		Chloromethane	ug/Kg	n/a	<1.6	<1.6	n/a	n/a	n/a	n/a	2	n/a
S04M000118		Methylene Chloride	ug/Kg	n/a	<1.3	<1.2	n/a	n/a	n/a	n/a	1	n/a
S04M000118		Acetone	ug/Kg	n/a	<0.92	41	n/a	n/a	n/a	n/a	0.9	n/a
S04M000118		1,1-Dichloroethane	ug/Kg	n/a	<0.80	<0.79	n/a	n/a	n/a	n/a	0.8	n/a
S04M000118		1,2-Dichloroethene (cis & trans)	ug/Kg	n/a	<1.4	<1.4	n/a	n/a	n/a	n/a	1	n/a
S04M000118		Chloroform	ug/Kg	n/a	<0.72	14	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		1,2-Dichloroethane	ug/Kg	n/a	<0.76	<0.75	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		2-Butanone	ug/Kg	n/a	<0.82	22	n/a	n/a	n/a	n/a	0.8	n/a
S04M000118		1,1,1-Trichloroethane	ug/Kg	n/a	<0.70	<0.69	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		Carbon Tetrachloride	ug/Kg	n/a	<1.3	2.9e+02	n/a	n/a	n/a	n/a	1	n/a
S04M000118		Trichloroethene	ug/Kg	1.0e+02	<0.86	1.1	n/a	n/a	n/a	n/a	0.8	n/a
S04M000118		Benzene	ug/Kg	1.0e+02	<0.66	0.97	n/a	n/a	n/a	n/a	0.6	n/a
S04M000118		4-Methyl-2-pentanone	ug/Kg	n/a	<0.74	<0.73	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		Tetrachloroethane	ug/Kg	n/a	<0.70	1.6	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		Toluene	ug/Kg	97	<0.64	0.97	n/a	n/a	n/a	n/a	0.6	n/a
S04M000118		Chlorobenzene	ug/Kg	1.0e+02	<0.76	0.98	n/a	n/a	n/a	n/a	0.7	n/a
S04M000118		Ethylbenzene	ug/Kg	n/a	<0.98	<0.97	n/a	n/a	n/a	n/a	1	n/a
S04M000118		Xylenes (total)	ug/Kg	n/a	<1.6	<1.6	n/a	n/a	n/a	n/a	2	n/a
S04M000118		1,1-Dichloroethene	ug/Kg	95	<0.76	1.1	n/a	n/a	n/a	n/a	0.7	n/a

2200000

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-097		Page 1 of 1	
Collector Gent/Popo/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9C3426		SAF No. F03-018		Air Quality [ ]			
Ice Chest No. <b>ERC-99-005</b>		Field Logbook No. HNF-N-3361		COA 119152ES10		Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A					
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B191Y5				Preservation		Cool 4C	Cool 4C	None	
Special Handling and/or Storage				Type of Container		uGs*	uG	P	
				No. of Container(s)		3	1	1	
				Volume		40mL	60mL	500mL	
SAMPLE ANALYSIS				See item (1) in Special Instructions		See item (2) in Special Instructions		See item (3) in Special Instructions	
								returned to customer on new chain of custody	
Sample No.	Matrix *	Sample Date	Sample Time						
B191Y4	SOIL	4/21/04	0930	X	X	X			
				These two bottles were relabeled as B91Y7 for return. PAB 4/29/04					
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>** The laboratory is to achieve a detection limit of 5 pCi/g and 10 pCi/g for gross alpha and gross beta, respectively.</p> <p>(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene) (2) Semi-VOA - 8270A (TCL); Semi-VOA - 8270A (Add-On) (1,2,4-Trimethylbenzene, Cyclohexanone, Triethyl phosphate) (3) Gross Alpha; Gross Beta; Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-On (Antimony-125, Cesium-134); Americium-241; Isotopic Plutonium; Isotopic Thorium (Thorium-232); Isotopic Uranium (Uranium-235, 238); Neptunium-237; Total Uranium</p> <p>60mL and 500mL bottles associated with these analyses were returned to customer on a new chain of custody per email request from S.J. Trent 4/28/04</p>	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		Matrix *	
LABORATORY SECTION		Received By		Title		Date/Time		S=Soil SC=Scalant SC=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solid E=Drum Liquid W=Waste L=Liquid V=Vapor X=Other	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

## GENERATOR KNOWLEDGE INFORMATION

1. Chain of Custody Number \_\_\_\_\_ CACN/COA 1184782920 Customer Identification Number \_\_\_\_\_

2. List generator knowledge or description of process that produced sample. Or list description of sample source:

216-Z-9 Trench DNAPL Investigation

MSDS Available? ☒ No ☐ Yes Hanford MSDS No. \_\_\_\_\_

3. List all waste codes and constituents associated with the waste or media that was sampled, regardless of CERCLA status.

a) Does the sample contain any of the following listed waste codes?

*By checking "unknown" the customer understands that no knowledge is available following a careful search.*

List Federal Waste Code(s):

List Constituent(s):

P Codes: _____	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
U Codes: _____	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
K Codes: _____	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
F Codes: <u>P001</u> <u>Carbon tetrachloride</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unknown

b) List applicable characteristic waste codes, flash point, pH, constituents, and concentrations as appropriate.

D001: <input type="checkbox"/> FP <100°F <input type="checkbox"/> FP ≥100 <140°F <input type="checkbox"/> DOT Oxidizer	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
D002: <input type="checkbox"/> pH ≤2 <input type="checkbox"/> pH ≥12.5 <input type="checkbox"/> Solid Corrosive (WSC2)	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
D003: <input type="checkbox"/> Cyanide <input type="checkbox"/> Sulfide <input type="checkbox"/> Water Reactive <input type="checkbox"/> Other _____	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
D004-D043 (Identify applicable waste codes and concentrations): _____	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown

c) If characteristic, list any known underlying hazardous constituents (UHCs) reasonably expected to be present, and their concentrations that may be present above the LDR treatment standard (40 CFR 268.48):

N/A

d) List any known Land Disposal Restrictions (LDR) subcategories, if applicable (40 CFR 268.40):

N/A

e) List any applicable Washington State dangerous waste codes: (not required if federally regulated)

(\*State mixture rule for Ignitability)

WT01: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP01: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
WT02: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP02: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
WT03: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown	WP03: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown
List constituents and concentrations:	F003: <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Unknown

4. Is this material TSCA regulated for PCBs? ☐ Yes ☒ No ☐ Unknown ☐ Analysis Requested

List concentration if applicable: \_\_\_\_\_

If yes, what is the source of the PCBs? (see TSCA PCB Hanford Site User Guide, DOE/RL-2001-50)

<input type="checkbox"/> PCB Liquid Waste	<input type="checkbox"/> PCB Bulk Product Waste	<input type="checkbox"/> PCB Transformer ≥500 ppm	<input type="checkbox"/> Unknown
<input type="checkbox"/> PCB Remediation Waste	<input type="checkbox"/> PCB R&D Waste	<input type="checkbox"/> PCB contaminated electrical equipment (capacitor/ballast) <500 ppm	
<input type="checkbox"/> PCB Spill Material	<input type="checkbox"/> PCB Item	<input type="checkbox"/> Other PCB Waste (list) _____	

5. Is this material TRU? ☐ Yes ☐ No ☒ Unknown

### 6. ACCURACY OF INFORMATION

Based on my inquiry of those individuals immediately responsible for obtaining this information, that to the best of my knowledge, the information entered in this document is true, accurate, and complete.

Print & Sign \_\_\_\_\_

Date 10/6/03

Attachment 2  
29 TRENCHES  
Data Summary Report

CORE NUMBER: 222S20040101

SEGMENT #: B191Y4-A

SEGMENT PORTION: VOA

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count	Err%
S04M000123			Vinyl Chloride	ug/Kg	n/a	<1.5e+02	<1.5e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	n/a
S04M000123			Chloromethane	ug/Kg	n/a	<1.6e+02	<1.6e+02	n/a	n/a	n/a	n/a	2.e+02	n/a	n/a
S04M000123			Methylene Chloride	ug/Kg	n/a	<1.3e+02	<1.2e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	n/a
S04M000123			Acetone	ug/Kg	n/a	<92	5.9e+02	n/a	n/a	n/a	n/a	9.e+01	n/a	n/a
S04M000123			1,1-Dichloroethane	ug/Kg	n/a	<80	<79	n/a	n/a	n/a	n/a	8.e+01	n/a	n/a
S04M000123			1,2-Dichloroethane (cis & trans)	ug/Kg	n/a	<1.4e+02	<1.4e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	n/a
S04M000123			Chloroform	ug/Kg	n/a	<72	<71	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			1,2-Dichloroethane	ug/Kg	n/a	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			2-Butanone	ug/Kg	n/a	<82	<81	n/a	n/a	n/a	n/a	8.e+01	n/a	n/a
S04M000123			1,1,1-Trichloroethane	ug/Kg	n/a	<70	<69	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			Carbon Tetrachloride	ug/Kg	n/a	<1.3e+02	<1.3e+02	n/a	n/a	n/a	n/a	1.e+02	n/a	n/a
S04M000123			Trichloroethane	ug/Kg	83	<86	<85	n/a	n/a	n/a	n/a	8.e+01	n/a	n/a
S04M000123			Benzene	ug/Kg	94	<66	<65	n/a	n/a	n/a	n/a	6.e+01	n/a	n/a
S04M000123			4-Methyl-2-pentanone	ug/Kg	n/a	<74	<73	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			Tetrachloroethene	ug/Kg	n/a	<70	<69	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			Toluene	ug/Kg	1.0e+02	<64	<63	n/a	n/a	n/a	n/a	6.e+01	n/a	n/a
S04M000123			Chlorobenzene	ug/Kg	99	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a
S04M000123			Ethylbenzene	ug/Kg	n/a	<98	<97	n/a	n/a	n/a	n/a	1.e+02	n/a	n/a
S04M000123			Xylenes (total)	ug/Kg	n/a	<1.6e+02	<1.6e+02	n/a	n/a	n/a	n/a	2.e+02	n/a	n/a
S04M000123			1,1-Dichloroethene	ug/Kg	79	<76	<75	n/a	n/a	n/a	n/a	7.e+01	n/a	n/a

1000000

CH2M-0401824

Attachment 3

**SAMPLE BREAKDOWN DIAGRAM**

Consisting of 6 pages, including coversheet

0000033



Z9 TRENCH4  
216-Z-9 Borehole samples  
Group 222S20040061

B17N61

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000022

VOA  
(Method 8260B)

(low-level)

22200061

# Z9 TRENCH5

## 216-Z-9 Borehole samples

### Group 222S20040073

**B18XR8**

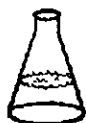
60 mL amber  
glass septum bottle  
(cool 4°C)



**S04M000099**

Received

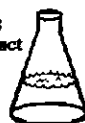
SVOA  
Extract



**S04M000106**

SVOA  
(Method 8270C)

PCB  
Extract



**S04M000107**

PCB  
(Method 8082)

Environmental  
Acid  
Digest



**S04M000108**

<sup>238</sup>Pu and <sup>239,240</sup>Pu

**B190T8-A**

20 mL glass/poly



**S04M000097**

GEA radscreen

**B18XR8**

60 mL amber  
glass septum bottle  
(cool 4°C)



**S04M000100**

Received

Environmental  
Acid  
Digest



**S04M000228**

<sup>87</sup>Sr

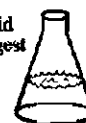
Water  
Digest



**S04M000102**

IC: F, Cl, NO<sub>3</sub>,  
NO<sub>2</sub>, PO<sub>4</sub>, SO<sub>4</sub>

Acid  
Digest



**S04M000103**

ICP: Sb, As, Ba, Be,  
Bi, Cd, Cr, Cu,  
Pb, Li, Mn, Ni,  
Sc, Ag, F, Sr, Zn

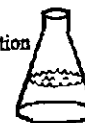
Environmental  
Acid  
Digest



**S04M000104**

Total Alpha/Beta  
<sup>237</sup>Np  
<sup>241</sup>Am  
<sup>239</sup>Pu  
<sup>240</sup>Pu  
GEA: <sup>60</sup>Co, <sup>137</sup>Sb, <sup>64</sup>Cs,  
<sup>137</sup>Cs, <sup>152</sup>Eu, <sup>154</sup>Eu,  
<sup>152</sup>Eu  
ICP/MS: <sup>235</sup>U, <sup>236</sup>U, <sup>238</sup>U,  
<sup>232</sup>Th  
Total Uranium

NH<sub>4</sub>  
Distillation



**S04M000105**

IC: NH<sub>4</sub>

**B18XR8**

120 ml bottle  
(cool 4°C)



**S04M000101**

Received

Hg  
pH  
CN  
Sulfide

000000

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040073

B18XW3

3x40 mL amber  
glass septum bottle  
(cool 4 °C)



S04M000096

VOA  
(Method 8260B)

(low-level)

B18XR8

3x5 g EnCore  
Sampler  
(cool 4 °C)



S04M000095

VOA  
(Method 8260B)

(high-level)

222S20040073

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040100

B17N64

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000115

VOA  
(Method 8260B)

(low-level)

B17N64-A

2x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000124

VOA  
(Method 8260B)

(additional low-level  
analysis)

B17N68

3x5 g EnCore  
Sampler  
(cool 4°C)



S04M000116

VOA  
(Method 8260B)

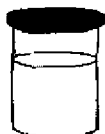
(high-level)

000000

Z9 TRENCH5  
216-Z-9 Borehole samples  
Group 222S20040101

B191Y4

3x40 mL amber  
glass septum bottle  
(cool 4°C)



S04M000118

VOA  
(Method 8260B)  
(preserved a portion for  
low-level analysis)

B191Y4-A

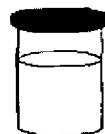


S04M000123

VOA  
(Method 8260B)  
(preserved a portion for  
high-level analysis)

B191Y4

60 mL amber  
glass bottle  
(cool 4°C)



S04M000119

Received

B191Y4

500 mL bottle



S04M000120

Received

Analysis request was cancelled per customer  
contact on 4/28/04. Samples were returned to  
customer on 4/29/04.

Z906000

CH2M-0401824

Attachment 4

SAMPLE RECEIPT PAPERWORK

Consisting of 12 pages, including coversheet

0000038

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-058		Page 1 of 1	
Collector Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N      Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval <del>86'-88.5'</del> <sup>88'-90'</sup> - 92.5'				SAF No. F03-018		Air Quality <input type="checkbox"/>	
Ice Chest No. GRP-04-008		Field Logbook No. HNP-N-3361		COA 119152ES10		Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A				Bill of Lading/Air Bill No. N/A			
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> RADIOACTIVE TIE TO: B17N61  <b>Special Handling and/or Storage</b> SAMPLERS: Collect 5 g with the encore sampler. If RAD < 0.5 mrem/hr take sample to WSCF. Sample analysis must occur in 48 hours or preserve with methanol.					Preservation		Cool AC		
					Type of Container		P		
					No. of Container(s)		3		
					Volume		5g		
SAMPLE ANALYSIS					See item (1) in Special Instructions.				
Sample No.	Matrix *	Sample Date	Sample Time						
B17N61	SOIL	3-23-4	0835	—					
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time	(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)  Matrix * S=Soil SE=Solids SO=Soil SL=Sludge W=Water O=Oil A=Air DS=Dry Solids DL=Dry Liquids T=Trace WL=Wipe L=Liquid VL=Volatiles X=Other			
Karin D. Hughes		3-23-4 12:30	216 Z9 RMA Trailer		3-23-4 12:30				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
216 Z9 RMA Trailer		3-24-4 13:30	Karin D. Hughes		3-24-4 13:30				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Karin D. Hughes		3-23-4 13:45	RLC Chambers		3-24-4 13:45				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-082		Page 1 of 1														
Collector Pope/Pfister/Hughes/Wiberg		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N														
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		DEPTH 10' - 112 5'		SAF No. F03-018		Data Turnaround 60 Days														
Ice Chest No.		Field Logbook No. HNF-N-3361		COA 119152ES10		Method of Shipment Government Vehicle																
Shipped To 222-S Lab Operations		Offsite Property No. N/A				Bill of Lading/Air Bill No. N/A																
POSSIBLE SAMPLE HAZARDS/REMARKS  Special Handling and/or Storage					Preservation	Coel 4C																
					Type of Container	P																
					No. of Container(s)	3																
					Volume	5g																
SAMPLE ANALYSIS					See item (1) in Special Instructions																	
Sample No.	Matrix *	Sample Date	Sample Time																			
B18XR8	SOIL	4/8/04	1015	✓																		
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS					Matrix *												
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) VOA - 8260A - Complete, VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)					S=Soil SB=Soil and SO=Soil SI=Soil W=Water C=Oil A=Air DS=Dry Solids DL=Dry Liquids T=Trace WP=Wipe L=Liquid V=Volatiles X=Other									
David Tyra/Removal		4/8/04 1435		Site Frige		4/8/04 1535																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
Site Frige		4/8/04 1534		David Tyra/Removal		4/8/04 1534																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
David Tyra/Removal		4/8/04 1556		Keith Fuller for M. Pulliam		4/8/04 1558																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																
LABORATORY SECTION		Received By				Title				Date/Time												
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By				Date/Time												



FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-091		Page 1 of 1													
Collector Poppe/Pfister/Hughes/Wiberg		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 60 Days													
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426		110'-112.5' AP		SAF No. F03-018		Air Quality <input type="checkbox"/>													
Ice Chest No. S/N 243-050024		Field Logbook No. INT-N-3361		COA 119152ES10		Method of Shipment Government Vehicle															
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A																	
POSSIBLE SAMPLE HAZARDS/REMARKS																					
Special Handling and/or Storage					Preservation	Gen 4C															
					Type of Container	Q															
					No. of Container(s)	3															
					Volume	40mL															
SAMPLE ANALYSIS					See item (1) in Special Instructions																
Sample No.	Matrix *	Sample Date	Sample Time																		
B18XW3	SOIL	4-8-4	1015	✓																	
CHAIN OF POSSESSION					SPECIAL INSTRUCTIONS					Matrix *											
Relinquished By/Removed From R. PFISTER/10/15		Date/Time 4-8-4 1435		Received By/Stored In SITE FILE		Date/Time 4-8-4 1435		(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)					S=Soil SB=Settlement SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Dust Solids DL=Dust Liquid T=Tissue W=Wipe L=Liquid V=Vegetation X=Other								
Relinquished By/Removed From Site File		Date/Time 4/14/04 1015		Received By/Stored In Carol Thomas/10/15		Date/Time 4/14/04															
Relinquished By/Removed From Carol Thomas/10/15		Date/Time 4/14/04 1100		Received By/Stored In R. Steele		Date/Time 4/14/04															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time															
LABORATORY SECTION		Received By		Title		Date/Time															
FINAL SAMPLE DISPOSITION		Dispose Method		Disposed By		Date/Time															

<b>1. SHIP FROM U.S. DEPT. OF ENERGY C/O</b> Company <u>Fluor Hanford, Inc</u> Address <u>Z-9 Trench / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Contact <u>M. A. Baechler</u> Phone <u>509-531-0638</u>		<b>RADIOACTIVE SHIPMENT RECORD</b> <div style="float: right;">0000327 3.</div> <div style="clear: both;"></div>																																					
		Page 1 of 1																																					
		Ship <input checked="" type="checkbox"/> Prepaid <input type="checkbox"/> Collect <span style="float: right;">4.</span>																																					
		Via <input checked="" type="checkbox"/> Motor <input type="checkbox"/> Air Psgr <input type="checkbox"/> UPS <input type="checkbox"/> Rail <input type="checkbox"/> Air Cargo <input type="checkbox"/> Site Carrier																																					
		SHIPMENT AUTHORIZATION NUMBER <u>N/A</u>																																					
<b>2. SHIP TO</b> Company <u>CH2M Hill Hanford Group</u> Address <u>222-S Analytical Laboratory / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Attention <u>R. A. Bushaw</u> Phone <u>509-373-4314</u>		<b>Markings Applied</b> 6. Radioactive - LSA <input type="checkbox"/> Radioactive - SCO <input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B with trafoil <input type="checkbox"/> <b>LSA Description</b> 8. LSA-I <input type="checkbox"/> LSA-II <input type="checkbox"/> LSA-III <input type="checkbox"/> SCO-I <input type="checkbox"/> SCO-II <input type="checkbox"/> <b>Labels Applied</b> 10. Empty <input type="checkbox"/> Radioactive White - I <input checked="" type="checkbox"/> Radioactive Yellow - II <input type="checkbox"/> Radioactive Yellow - III <input type="checkbox"/> Subsidiary Hazard <input type="checkbox"/>																																					
		For Normal Form only 7. Identify Physical Form <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input checked="" type="checkbox"/> Solid Chemical Form <input type="checkbox"/> Elemental <input type="checkbox"/> Metal <input type="checkbox"/> Nitrate <input checked="" type="checkbox"/> Oxide <input type="checkbox"/> Mixture <input type="checkbox"/> Other																																					
<b>5. HM Proper Shipping Name:</b> _____ Radioactive Material. <input type="checkbox"/> excepted package - empty packaging 7 UN2910 <input type="checkbox"/> excepted package - instruments or articles 7 UN2910 <input type="checkbox"/> excepted package - limited quantity of material 7 UN2910 <input type="checkbox"/> excepted package - articles manufactured from natural or depleted uranium or natural thorium 7 UN2910 <input type="checkbox"/> Special Form, n.o.s. 7 UN2974 <input type="checkbox"/> Low Specific Activity, n.o.s. 7 UN2912 <input type="checkbox"/> n.o.s. 7 UN2982 <input type="checkbox"/> Fissile, n.o.s. 7 UN2918 <input type="checkbox"/> Surface Contaminated Object 7 UN2913 <input checked="" type="checkbox"/> Type A Package 7 UN2915		<b>EMERGENCY RESPONSE</b> 9. Telephone <u>509-373-3800</u> Emergency Response Guide(s) <u>163</u> Highway Route Controlled Quantity <input type="checkbox"/> Exclusive Use Shipment <input type="checkbox"/> with instructions <input type="checkbox"/> Placards Applied <input type="checkbox"/> If Rail Specify: Fissile Excepted, Grams <u>2.612E-5</u> <input checked="" type="checkbox"/> Excepted Package Statement <input type="checkbox"/>																																					
Warning -- Fissile Material Controlled Shipment. Do Not Load More Than _____ Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>11. No. Pkg.</th> <th>Model Package</th> <th>COC/Spec</th> <th>Serial No.</th> <th>Seal No.</th> <th>Isotopes</th> <th>T.I.</th> <th>Bq/Package</th> <th>Gr. Wt. Kg.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VPS-RXKT-</td> <td>4H2V/X71/S/03/USA</td> <td>2103-05024</td> <td>N/A</td> <td>Am-241, Pu-239</td> <td>0</td> <td>5.40E5</td> <td>35</td> </tr> <tr> <td></td> <td>005C</td> <td>/M4563</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6"></td> <td colspan="3" style="text-align: right;">TOTALS <u>0 5.40E5 35</u></td> </tr> </tbody> </table>				11. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.	1	VPS-RXKT-	4H2V/X71/S/03/USA	2103-05024	N/A	Am-241, Pu-239	0	5.40E5	35		005C	/M4563													TOTALS <u>0 5.40E5 35</u>		
11. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.																															
1	VPS-RXKT-	4H2V/X71/S/03/USA	2103-05024	N/A	Am-241, Pu-239	0	5.40E5	35																															
	005C	/M4563																																					
						TOTALS <u>0 5.40E5 35</u>																																	
(Shipper may describe package in detail on one of the unused lines above)																																							
<b>12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.</b> Certifier's Signature <u>M.A. Baechler</u> On behalf of DOE-RL Date <u>04/14/2004</u> Organization <u>FH Geosciences Support</u> Complete Cost Code (Inc. End Function) <u>119152ES20</u>																																							
<b>13. Surface Dose Rate of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <input type="checkbox"/> <0.5 or _____ mrem/hr (N+B γ) <b>Dose Rate @ 1 Meter from Surface of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <input type="checkbox"/> <0.5 or _____ mrem/hr (N+B γ) <b>Additional Data and Instructions (Inc. Readings on Internal Packaging)</b> <u>NA</u> Signature - Radiation Monitoring <u>R. Baechler</u> <b>Smears of Outer Container</b> <input checked="" type="checkbox"/> <0.41 Bq (22 dpm) β γ/cm <sup>2</sup> <input checked="" type="checkbox"/> <0.04 Bq (2.2 dpm) α/cm <sup>2</sup> <input checked="" type="checkbox"/> <TbI. 2-2 HSRM Onsite Limits <b>TRUCK LOAD OR EXCLUSIVE USE</b> Surface <input checked="" type="checkbox"/> <2 mSv/hr (200 mrem/hr) @ 2 meters <input checked="" type="checkbox"/> <0.1 mSv/hr (10 mrem/hr) @ Cab <input checked="" type="checkbox"/> <0.02 mSv/hr (2 mrem/hr) (Using N+B γ) or sleeper Bldg. <u>NEAK</u> Survey No. <u>GW-04-0358</u> Date <u>4/14/04</u> <u>Z-9 CR13</u>																																							
<b>14. TRANSPORTER</b> Vehicle Number <u>663-026911</u> DRIVER SIGNATURE <u>M.A. Baechler</u> <b>RECEIVER</b> RECEIVERS SIGNATURE <u>R. Baechler</u> Date <u>4/14/04</u>																																							
<b>15. OFFSITE AUTHORIZATION</b> Shipment has been inspected and verified to be in compliance with DOT regulations Authorized Signature _____ Printed Name _____ Date _____																																							
<b>16. AUTHORIZATION FOR SHIPMENT</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="width:15%;"> <b>AIR TRANSPORT CERTIFICATION</b>  <input type="checkbox"/> N/A         </td> <td style="width:20%;"> <b>CARGO AIRCRAFT</b>  <input type="checkbox"/> Cargo Aircraft Only Labels Applied         </td> <td style="width:20%;"> <b>PASSENGER AIRCRAFT</b>  <input type="checkbox"/> Ltd Qty <input type="checkbox"/> Research/Medical Diagnosis  <input type="checkbox"/> &lt;3 T.I. <input type="checkbox"/> Human Medical Research         </td> <td style="width:45%;"> <b>Pkg. Dimensions (cm)</b> </td> </tr> <tr> <td colspan="3"></td> </tr> </table>				<b>AIR TRANSPORT CERTIFICATION</b> <input type="checkbox"/> N/A	<b>CARGO AIRCRAFT</b> <input type="checkbox"/> Cargo Aircraft Only Labels Applied	<b>PASSENGER AIRCRAFT</b> <input type="checkbox"/> Ltd Qty <input type="checkbox"/> Research/Medical Diagnosis <input type="checkbox"/> <3 T.I. <input type="checkbox"/> Human Medical Research	<b>Pkg. Dimensions (cm)</b>																																
<b>AIR TRANSPORT CERTIFICATION</b> <input type="checkbox"/> N/A	<b>CARGO AIRCRAFT</b> <input type="checkbox"/> Cargo Aircraft Only Labels Applied	<b>PASSENGER AIRCRAFT</b> <input type="checkbox"/> Ltd Qty <input type="checkbox"/> Research/Medical Diagnosis <input type="checkbox"/> <3 T.I. <input type="checkbox"/> Human Medical Research	<b>Pkg. Dimensions (cm)</b>																																				
<b>17. OFFSITE AUTHORIZATION</b> Tracking No. _____ Date Shipped _____ Routing _____ ETA _____ Surveyed By _____ Date _____ Approved for Shipment Offsite _____ Date _____																																							

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-096		Page 2 of 4	
Collector <b>PHIL GENT</b>		Company Contact <b>STEVE TRENT</b>		Telephone No. <b>373 5869</b>		Project Coordinator <b>TRENT, SJ</b>		Price Code <b>8N</b>	
Project Designation <b>21 6-Z-9 Trench Characterization Borehole - Soil</b>		Sample Location <b>216-Z-9/C3426 112'</b>		SAF No. <b>F03-018</b>		Air Quality <input type="checkbox"/>		Data Turnaround <b>60 Days</b>	
Ice Chest No. <b>GRP-04-006</b>		Field Logbook No. <b>HNF-N-3601</b>		COA <b>119152 E510</b>		Method of Shipment <b>G.V.</b>			
Shipped To <b>222-S Lab Operations</b>		Offsite Property No. <b>N/A</b>				Bill of Lading/Air Bill No. <b>N/A</b>			
POSSIBLE SAMPLE HAZARDS/REMARKS									
Special Handling and/or Storage		Preservation		<b>NONE</b>					
		Type of Container		<b>P</b>					
		No. of Container(s)		<b>1</b>					
		Volume		<b>20 ml</b>					
SAMPLE ANALYSIS									
Sample No.	Matrix *	Sample Date	Sample Time						
B19078	<b>SOIL</b>	<b>4/15/04</b>	<b>1413</b>	<b>✓</b>					
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS					
Relinquished By/Removed From <b>P.M. GENT</b>		Date/Time <b>4/15/04</b>		Received By/Stored In <b>R. Bushaw</b>		Date/Time <b>4/15/04</b>		Matrix *	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		S-Soil SF-Soil SO-Soil W-Water O-Oil A-Air DS-Dust/Smoke CL-Cloud/Liquid T-Tissue W-Wipe L-Liquid V-Vegetation X-Other	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
LABORATORY SECTION	Received By		Title		Date/Time				
FINAL SAMPLE DISPOSITION	Disposal Method		Disposed By		Date/Time				

A-6003-618(03/03)

0000000000

456789

<b>1. SHIP FROM U.S. DEPT. OF ENERGY C/O</b> Company <u>Fluor Hanford, Inc.</u> Address <u>Z-9 Trench / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Contact <u>M. A. Baechler</u> Phone <u>509-531-0638</u>				<b>RADIOACTIVE SHIPMENT RECORD</b> 0000331 3.		Page1 of1																																					
<b>2. SHIP TO</b> Company <u>CH2M Hill Hanford Group</u> Address <u>222-S Laboratory / 200W</u> City, State, Zip <u>Richland, WA 99352</u> Attention <u>R. A. Bushaw</u> Phone <u>509-373-4314</u>				<b>SHIPMENT AUTHORIZATION NUMBER</b> <u>N/A</u>		<b>4.</b> Ship <input checked="" type="checkbox"/> Prepaid <input type="checkbox"/> Collect Via <input checked="" type="checkbox"/> Motor <input type="checkbox"/> Air Psgr <input type="checkbox"/> UPS <input type="checkbox"/> Rail <input type="checkbox"/> Air Cargo <input type="checkbox"/> Site Carrier																																					
<b>5. HM Proper Shipping Name:</b> _____ Radioactive Material, _____ excepted package - empty packaging 7 UN2910 excepted package - instruments or articles 7 UN2910 excepted package - limited quantity of material 7 UN2910 excepted package - articles manufactured from natural or depleted uranium or natural thorium 7 UN2910 Special Form, n.o.s. 7 UN2974 Low Specific Activity, n.o.s. 7 UN2912 n.o.s. 7 UN2982 Fissile, n.o.s. 7 UN2918 Surface Contaminated Object 7 UN2913 X Type A Package 7 UN2915				<b>6. Markings Applied</b> Radioactive - LSA <input type="checkbox"/> Radioactive - SCO <input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B with trefoil <input type="checkbox"/> <b>8. LSA Description</b> LSA-I <input type="checkbox"/> LSA-II <input type="checkbox"/> LSA-III <input type="checkbox"/> SCO-I <input type="checkbox"/> SCO-II <input type="checkbox"/> <b>10. Labels Applied</b> Empty <input type="checkbox"/> Radioactive White - I <input checked="" type="checkbox"/> Radioactive Yellow - II <input type="checkbox"/> Radioactive Yellow - III <input type="checkbox"/> Subsidiary Hazard <input type="checkbox"/>		<b>7. For Normal Form only</b> Identify Physical Form <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input checked="" type="checkbox"/> Solid Chemical Form <input type="checkbox"/> Elemental <input type="checkbox"/> Metal <input type="checkbox"/> Nitrate <input checked="" type="checkbox"/> Oxide <input type="checkbox"/> Mixture <input type="checkbox"/> Other																																					
<b>Warning - Fissile Material Controlled Shipment. Do Not Load More Than N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.</b>				<b>9. EMERGENCY RESPONSE</b> Telephone <u>509-373-3800</u> <b>Emergency Response Guide(s)</b> <u>163</u>		<b>10. Highway Route Controlled Quantity</b> <input type="checkbox"/> <b>Exclusive Use Shipment</b> <input type="checkbox"/> with instructions <b>Placards Applied</b> <input type="checkbox"/> <b>If Rail Specify:</b> Fissile Excepted, Grams <u>3.55E-4</u> <input checked="" type="checkbox"/> Excepted Package Statement <input type="checkbox"/>																																					
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>11. No. Pkg.</th> <th>Model Package</th> <th>COC/Spec</th> <th>Serial No.</th> <th>Seal No.</th> <th>Isotopes</th> <th>T.I.</th> <th>Bq/Package</th> <th>Gr. Wt. Kg.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VPS-BXKT-</td> <td>4H2V/X71/S/03/USA</td> <td>2/03-</td> <td>N/A</td> <td>Am-241, Pu-239</td> <td>0</td> <td>6.6186</td> <td>35</td> </tr> <tr> <td></td> <td>005</td> <td>/M4563</td> <td>050024</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="7" style="text-align: right;">TOTALS</td> <td>6.6186</td> <td>35</td> </tr> </tbody> </table>								11. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.	1	VPS-BXKT-	4H2V/X71/S/03/USA	2/03-	N/A	Am-241, Pu-239	0	6.6186	35		005	/M4563	050024						TOTALS							6.6186	35
11. No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package	Gr. Wt. Kg.																																			
1	VPS-BXKT-	4H2V/X71/S/03/USA	2/03-	N/A	Am-241, Pu-239	0	6.6186	35																																			
	005	/M4563	050024																																								
TOTALS							6.6186	35																																			
<b>12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.</b> Certifier's Signature <u>M. A. Baechler</u> On behalf of DOE-RL Date <u>04/16/2004</u> Organization <u>FH Geosciences Support</u> Complete Cost Code (Inc. End Function) <u>119152BS20</u>																																											
<b>13. Surface Dose Rate of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <input type="checkbox"/> <0.5 or _____ mrem/hr (N+5 γ) <b>Dose Rate @ 1 Meter from Surface of Package</b> <input checked="" type="checkbox"/> <0.005 or _____ mSv/hr <input type="checkbox"/> <0.5 or _____ mrem/hr (N+5 γ) <b>Smears of Outer Container</b> <input checked="" type="checkbox"/> <0.41 Bq (22 dpm) β γ/cm <sup>2</sup> <input checked="" type="checkbox"/> <0.04 Bq (2.2 dpm) α /cm <sup>2</sup> <input checked="" type="checkbox"/> <Tbl. 2-2 HSRM Onsite Limits <b>TRUCK LOAD OR EXCLUSIVE USE</b> Surface <input checked="" type="checkbox"/> <2 mSv/hr (200 mrem/hr) @ 2 meters <input checked="" type="checkbox"/> <0.1 mSv/hr (10 mrem/hr) @ Cab or sleeper <input checked="" type="checkbox"/> <0.02 mSv/hr (2 mrem/hr) (Using N+5 γ) Additional Data and Instructions (inc. Readings on Internal Packaging) Signature - Radiation Monitoring <u>R. A. Bushaw</u> Bldg. <u>NEAL</u> Survey No. <u>CN-04-0365</u> Date <u>4/16/04</u> <u>Z-9 CRIB</u>																																											
<b>14. TRANSPORTER</b> Vehicle Number <u>063-0029</u> DRIVER SIGNATURE <u>M. A. Baechler</u> <b>RECEIVER</b> RECEIVED SIGNATURE <u>R. A. Bushaw</u> Date <u>4/16/04</u>																																											
<b>15. OFFSITE AUTHORIZATION</b> Shipment has been inspected and verified to be in compliance with DOT regulations Authorized Signature _____ Printed Name _____ Date _____																																											
<b>16. AUTHORIZATION FOR SHIPMENT</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:20%;"> <b>AIR TRANSPORT CERTIFICATION</b>  <input type="checkbox"/> N/A         </td> <td style="width:20%;"> <b>CARGO AIRCRAFT</b>  <input type="checkbox"/> Cargo Aircraft Only Labels Applied         </td> <td style="width:20%;"> <b>PASSENGER AIRCRAFT</b>  <input type="checkbox"/> Ltd Qty &lt;3 T.I.  <input type="checkbox"/> Research/Medical Diagnosis  <input type="checkbox"/> Human Medical Research         </td> <td style="width:40%;"> <b>Pkg. Dimensions (cm)</b> </td> </tr> </table>								<b>AIR TRANSPORT CERTIFICATION</b> <input type="checkbox"/> N/A	<b>CARGO AIRCRAFT</b> <input type="checkbox"/> Cargo Aircraft Only Labels Applied	<b>PASSENGER AIRCRAFT</b> <input type="checkbox"/> Ltd Qty <3 T.I. <input type="checkbox"/> Research/Medical Diagnosis <input type="checkbox"/> Human Medical Research	<b>Pkg. Dimensions (cm)</b>																																
<b>AIR TRANSPORT CERTIFICATION</b> <input type="checkbox"/> N/A	<b>CARGO AIRCRAFT</b> <input type="checkbox"/> Cargo Aircraft Only Labels Applied	<b>PASSENGER AIRCRAFT</b> <input type="checkbox"/> Ltd Qty <3 T.I. <input type="checkbox"/> Research/Medical Diagnosis <input type="checkbox"/> Human Medical Research	<b>Pkg. Dimensions (cm)</b>																																								
<b>17. OFFSITE AUTHORIZATION</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">Tracking No. _____</td> <td style="width:25%;">Date Shipped _____</td> <td style="width:25%;">Routing _____</td> <td style="width:25%;">ETA _____</td> </tr> <tr> <td>Surveyed By _____</td> <td>Date _____</td> <td>Approved for Shipment Offsite _____</td> <td>Date _____</td> </tr> </table>								Tracking No. _____	Date Shipped _____	Routing _____	ETA _____	Surveyed By _____	Date _____	Approved for Shipment Offsite _____	Date _____																												
Tracking No. _____	Date Shipped _____	Routing _____	ETA _____																																								
Surveyed By _____	Date _____	Approved for Shipment Offsite _____	Date _____																																								

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-059		Page 1 of 1																																									
Collector Pope/Pfister/Lughes		Company Contact Steve Trent		Telephone No. 373-3869		Project Coordinator TRENT, SJ		Price Code 8N Data Turnaround 60 Days																																									
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval 119-121.5'		SAF No. F03-018		Air Quality <input type="checkbox"/>																																											
Ice Chest No. 6PP-03-006		Field Logbook No. 4-15-04 186 HNF-N-3361-366-1		COA 119152ES10		Method of Shipment Government Vehicle																																											
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A																																													
POSSIBLE SAMPLE HAZARDS/REMARKS RADIOACTIVE TIE TO: B17NN4				<table border="1"> <tr> <td>Preservation</td> <td>Cool 4C</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Type of Container</td> <td>2Ga*</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>No. of Container(s)</td> <td>5</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Volume</td> <td>40mL</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>						Preservation	Cool 4C									Type of Container	2Ga*									No. of Container(s)	5									Volume	40mL								
Preservation	Cool 4C																																																
Type of Container	2Ga*																																																
No. of Container(s)	5																																																
Volume	40mL																																																
Special Handling and/or Storage SAMPLERS TO PUT 5 g soil into each vial with the encore sampler. Bottles are pre-labeled. Write the Hole number from the chain on each vial.																																																	
SAMPLE ANALYSIS				See Item (3) in Special Instructions.																																													
Sample No.	Matrix *	Sample Date	Sample Time																																														
B17N64	SOIL	4-21-04	1400	✓																																													
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *																																									
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		** 222-S Laboratory will provide 40 mL VOA vials that have been pre-preserved with sodium bisulfite. (1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene)																																									
Dana Wilkey (initials)		4/15/04		RHol		04/21/04																																											
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																																											
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																																											
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																																											
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time																																											
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		B=Soil SS=Solids SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquid T=Toxic W=Wipe L=Liquid V=Vegetation X=Other																																									
LABORATORY SECTION		Received By		Title				Date/Time																																									
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time																																									

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-018-060		Page 1 of 1	
Collector Pope/Pfister/Hughes		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 8N      Data Turnaround 60 Days	
Project Designation 216-Z-9 Trench Characterization Borehole - Soil		Sampling Location 216-Z-9/C3426 - Interval 119'-121.5'		SAF No. F03-018		Air Quality <input type="checkbox"/>			
Ice Chest No. <u>GPP-03-006</u>		Field Logbook No. <u>4-19-03 451</u> HNF-N-2364- <u>360-1</u>		COA 119152ES10		Method of Shipment Government Vehicle			
Shipped To 222-S Lab Operations		Offsite Property No. N/A		Bill of Lading/Air Bill No. N/A					
<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> RADIOACTIVE TIE TO: B17NN4  <b>Special Handling and/or Storage</b> SAMPLERS: Collect 5 g with the encore sampler. If RAD < 0.5 mrem/hr take sample to WSCF. Sample analysis must occur in 48 hours or preserve with methanol.				Preservation		Can: 4C			
				Type of Container		P			
				No. of Container(s)		3			
				Volume		5g			
SAMPLE ANALYSIS				See item (1) in Special Instructions.					
Sample No.		Matrix *		Sample Date		Sample Time			
B17N68		SOIL		4-21-4		1400		✓	
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) VOA - 8260A - Complete; VOA - 8260A (Add-On) (Acetonitrile, Hexane, n-Butylbenzene) 1	
<i>Dana W. B. (name)</i>		4/21/04		<i>R. P. Trent</i>		4/21/04			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		Matrix * S=Soil SE=Substrate SO=Solid SL=Sludge W=Water Q=Oil A=Air DS=Dry Solids XL=Crystalline L=Liquid V=Vegetation X=Other	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

0000047